Knowledge and Collaboration White Paper

Paul Blackburn
Senior Principal
AMS

Elizabeth Brodsky
Technical Architect
IBM

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Knowledge and Collaboration

Challenges Facing Government Executives

The IBM/AMS Knowledge and Collaboration System is designed to help government executives address the central questions of effectiveness, efficiency, and performance:

- **Strategic Management of Human Capital** — How to ensure organizations are performing when key skills are scarce, knowledge is diffused across the organization, and increasing numbers of highly experienced staff are nearing retirement
- **Expanding Electronic Government** — How to improve organizational productivity and efficiency when nearly all routine processes have already been automated
- **Budget and Performance Integration** — How to drive organizations to focus on results when staff are often far removed from programmatic results, and much of the organization considers results and performance to be beyond their influence

Strategic Management of Human Capital

Managing human capital begins with making the most of the assets that are already in place. Existing assets can be leveraged by providing staff with a way to find expertise — finding who-knows-what and who-is-responsible-for-what. Once found, expertise can be further leveraged by ensuring that knowledge is shared across as broad an audience as possible. Questions answered, best practices identified, knowledge shared should be available to anyone who needs that knowledge. The knowledge of senior staff should be captured as part of their daily work, and new staff can become productive quickly through ready access to people, expertise, and information.

Work is conducted in teams. Managing human capital means making teams effective, not just focusing on the skill sets of their component elements. Teams are more effective if they can share information, results, discoveries, and knowledge across time, location, and organizational boundaries. Teams are more effective if they can leverage the knowledge and capabilities of their own experts. And teams are more effective if they have the tools to reach out into the rest of the larger organization to access expertise, work products, and information to minimize the duplication of effort across the enterprise and leverage work that has already been done.

Expanding Electronic Government

Realizing the potential of electronic government calls for applying the concepts and technologies of digital government to agency-to-agency communication and collaboration so that information is shared more quickly, so that the volume and types of information that are shared expand, and so operations can be transformed to reduce costs and enhance service delivery based on the availability of information.

Intra-governmental collaboration and knowledge sharing is not just an opportunity — it is a necessity. Agencies have spent years defining themselves by their boundaries and the scope of their authority. But new programs and initiatives that cross the boundaries of those organizations are being created. To be effective, agencies must define themselves in terms of their missions, not their boundaries, and agencies must be able to work across organizational boundaries to deliver consistent, coordinated responses for these new missions. The public

expects agencies to be able to work together to react to and anticipate changing conditions as rapidly as those conditions and events change.

Budget and Performance Integration

Achieving programmatic success — getting to results and improving on results — demands an ability to organize work and deliver results across functional areas. This requires an ability to coordinate and function as a team across functional boundaries. Optimizing performance within a function focuses attention on the process, optimizing across organizational boundaries focuses attention on results.

Success for many agencies requires that their partner agencies be successful. Federal-state partnerships fit this description, and so do many programs that span agency boundaries. For these agencies and programs, the ability to work closely with others across time, location, and organization is essential to producing measurable results.

Providing for Homeland Security

Protecting US citizens and preserving the security of the nation calls upon nearly all of the capabilities of government across every level, and calls into sharper relief the need for technologies that enable government to react more swiftly and more cohesively. Homeland security requires the ability to

- Locate and leverage scarce knowledge and skills wherever they may be located
- Enable teams to form and respond quickly
- Collect and consolidate information and materials from multiple agencies
- Focus the entire team on the end result
- Connect staff across federal, state, and local governments whenever and wherever needed

Meeting the challenges of facing government executives today provides the basis for acting on Homeland Security needs.

The Knowledge and Collaboration System

The Knowledge and Collaboration System provides a basis for leveraging scarce skills and enabling collaboration to drive improved effectiveness and efficiency across locations and organizational boundaries, providing

- **Collaborative Workspaces** provide a virtual space where established teams can collaborate across time and location, where communities of interest can share knowledge and ideas, and where *ad hoc* teams can be formed and organized
- **Real-Time Collaboration** enabling staff to work together across locations and disparate technical infrastructures in real time using secure messaging and virtual meeting rooms
- **Taxonomy and Search** tools provide staff with the means to quickly find work products across the system and to monitor and filter volumes of external information
- **Expertise Location** puts the skills of the organization within the reach of each of its members
- **Document Management** controls access to and update of shared documents, securing documents and enabling geographically dispersed teams to collaborate on work products
- **Shared Calendars and Task Plans** enable cross-organizational teams to work off the same plan to the same schedule

- **Electronic Forms and Workflow** capture structured and semi-structured information and enable self-service for administrative processes, reducing the cost of routine, internal activities
- **eLearning** provides system training as well as a place to access tools for continual, lifetime learning
- **Personalized Portal** consolidates these tools in one place, providing users with the ability to assemble those tools in a form that is most appropriate for each user

Capabilities

▪ Threaded discussions ▪ Templates embedding government best practices ▪ Document version control and document check-in/check-out ▪ Shared group and team calendars ▪ Task management ▪ Contact lists ▪ User-managed access controls over shared workspaces ▪ Facility for moderating workspaces ▪ Document routing and approvals ▪ Electronic forms ▪ Workflow ▪ Collaborative workspaces created on-the-fly ▪ User-developed forms ▪ Ability to add content to workspaces through email ▪ Ability to create and manage private subspaces within workspaces ▪ Ability to post manuals, regulations, administrative notices, and other reference information ▪ Integration with MS Exchange, Lotus Notes, POP3 and HTML email systems	▪ Automatic generation of emails to workspace subscribers with events and updates ▪ Real time chat ▪ Desktop audio and video conferencing ▪ Real-time application sharing ▪ Real-time awareness of users logged in and available for collaboration ▪ Real-time white boarding ▪ Cross-agency/cross-organizational white pages ▪ External contact lists ▪ Search for internal and external experts ▪ Access to syndicated and aggregated news ▪ Index and search external web sites ▪ Index and search internal web sites, file structures, email directories, and ODBC database ▪ Automated support for the categorization of content into taxonomies ▪ Support for multiple taxonomies and ability to traverse and search taxonomies ▪ Keyword- and concept-based search ▪ Records Management compliant with DOD 5015.2-STD ▪ Provide access to mobile and wireless devices

Delivering Efficiency and Effectiveness

Individually and collectively these elements reduce costs by enabling government employees to

- **Do things faster** — by performing research, find experts, locate and contact others, collect information, or get documents approved through the system
- **Avoid duplication of effort** —— by discovering potentially redundant activities, building on work already performed, and by accessing the expertise of others
- **Reduce travel costs** —by meeting online, rather than traveling down the hall or across the country
- **Reduce internal administrative costs** — by centralizing activities to limit the staff needed to support internal administrative processes in the field

At the same time, employees become more effective by making fewer mistakes and by producing better results once they are able to

- **Use the experience of others —** by working through communities of interest, sharing best practices, and accessing the knowledge of experts
- **Clear bottlenecks online —** by streamlining approval processes and by finding where forms and documents are bottlenecked without walking forms and documents through the process
- **Collect and use information that was too costly to collect before** — by finding and contacting experts and locating work already performed by other agencies.

Our experience from engagements in the private sector is that these kinds of benefits can have a substantive impact on performance, as Figure 1 demonstrates.

Figure 1: Benefits of Knowledge and Collaboration

Client	Results	Knowledge and Collaboration
AT&T	Cut training time by 50% Increase productivity by 200%	Reorganize activity to coordinate across functional stovepipes
DuPont	50% decrease in time to make decisions	Virtual teams using best practices and accessing experts
IBM Software Management	50% reduction in training time 100% increase in productivity Saved 4-5 research hours per person per week	Transfer knowledge and methods from US to European teams
Kellogg Company	$500,000 reduction in annual overhead	Consolidate benefits function into a single office
Mail Boxes, etc.	60% reduction in call load	Online training, self-service most tech support queries
Rouse Company	77% reduction in training costs	Online training on newly centralized functions
Shaw Pittman	99% reduction in approval times on activities	Sharing knowledge and experience

Connecting People for Knowledge Sharing and Innovation

Knowledge creation and use are essentially human activities, not technical capabilities. When asked, public sector knowledge workers indicate that when they really need to know something, they go to a person, relying on their personal contacts and connections rather than information technology. The challenge organizations face in relying on personal networks for knowledge sharing is that these networks are limited—they take years to develop, they can be disrupted by retirement and reorganizations, they rarely cross geographic and agency boundaries, and they are typically focused on an individual's past work, not necessarily the task at hand. Many information systems strive address this challenge by attempting to end run natural behavior, connecting people solely to anonymous data and ignoring the human element of knowledge transfer.

The Knowledge and Collaboration System was designed not to replace but specifically to enhance the breadth and depth of connections between public sector knowledge workers. It is carefully designed around the way people naturally work and share information to create a virtual environment for identifying, accessing, and exchanging expertise—not as one function of the system but across its elements and capabilities. The power of creating multiple channels for connecting people became clear in the initial user training for the system, during which public sector staff spontaneously connected across borders and across organizations using virtual tools to conduct real work during training presentations. Real-time collaboration, expertise identification, community of practice and workspace membership, broad routing capabilities, linkage between content and people, virtual meeting and training spaces, and integrated information and community search provide people-to-people connections throughout the user experience. The result is a true virtual workplace, which, like the physical workplace, derives its value not primarily from its processes or record keeping, but from the capabilities of its staff working together.

The effect on government innovation and responsiveness can be exponential. John D. Donahue, of the Kennedy School of Government, conducted research into sources of innovation in the public sector and noted that the primary driver of award-winning Federal innovation was neither funding nor high-level pressure, but the personal drive and creativity of front-line employees committed to achieving their program's mission.[1] By enhancing the quality and quantity of connections between these sources of innovation, organizations can remove barriers and empower staff to create responsive solutions to new challenges.

Design and Architecture

Design Objectives

The Knowledge and Collaboration System was designed to

- **Integrate the various resources placed on the desktop** — by providing a single, consistent user interface and learning environment across the multiple resources within the system
- **Maximize hardware and operating system independence** — by employing web standards wherever possible
- **Connect to the widest variety of agency systems** — by using an extendable, open systems architecture

[1] Donahue, John D. ed., *Making Washington Work: Tales of Innovation in the Federal Government*, Brookings Institution Press, 1999.

- **Provide a robust, scalable security architecture —** to provide a single, consistent security system across all of the resources in the system, while allowing delegation of control over elements of security to staff in individual agencies and organizations
- **Enable single sign-on to all the tools in the system** — by providing consistent security across all the components in the system
- **Enable users to read and use documents from other agencies** — by supporting document viewers for diverse document and file formats
- **Minimize the change involved in the transition to the system**— by retaining and using existing agency email and calendaring systems

System Architecture

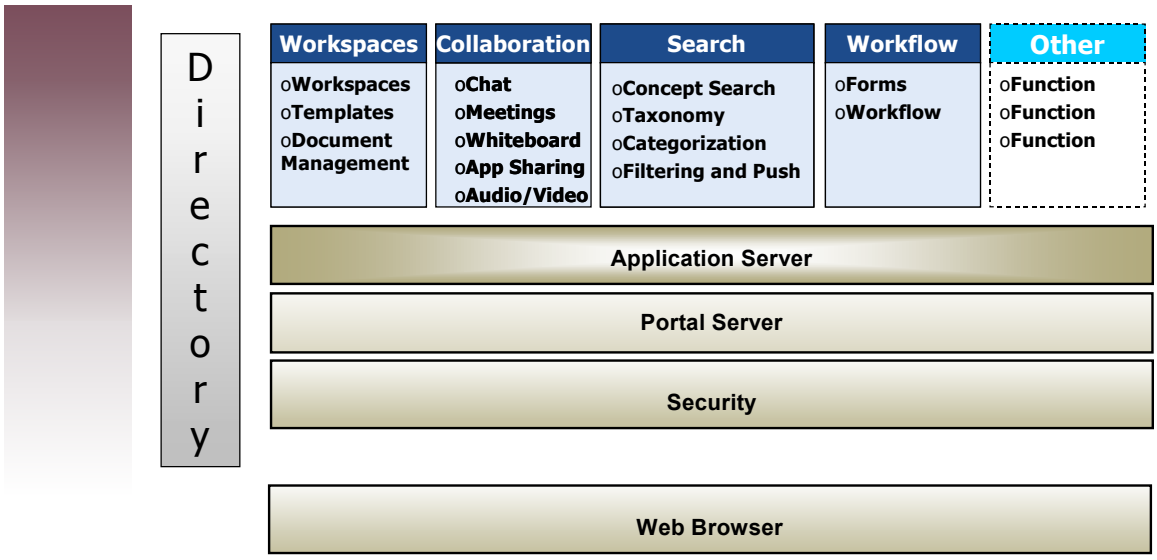
The Knowledge and Collaboration System was constructed from standard, off-the-shelf software using an open standards architecture, as depicted in Figure 2.

The system was designed with three principles in mind:

- **Employ a modular design**, based on an open standards that enables the system to change over time and allows component tools to be added, substituted, or removed as needed
- **Use a flexible, scalable architecture** that can be deployed as a centralized, regionalized, or fully distributed system, and can be reconfigured as the system is deployed or if agency needs change
- **Rely on Internet standards** to enable the system to be used across heterogeneous technical environments, which is important in an inter-agency environment

Designing for modularity accomplishes three objectives. First, it allows components to be added or removed as needed to adapt the system to the application and infrastructure of differing organizations, and it allows additional tools to be easily incorporated into the system to support the unique missions of agencies. Second, it allows the system to adapt over time as new software products become available and needs change. Finally, modularity based on open standards enables the integration of new components at reasonable cost.

Figure 2: Knowledge and Collaboration Architecture



A flexible, scalable architecture enables agencies deploying the system to start small and build from there. It allows highly distributed agencies to place component services close to end users, when doing so will enhance system response time, and it allows agencies to centralize services that can more efficiently be delivered from a single location. The architecture can be adapted to the communications infrastructure, organizational structure and topology, and varying economics of agencies, and can change over time as needed.

By using Internet standards, which are in the mainstream of every agency's technical direction, and by working with existing agency systems, like email, the system is designed to overcome the technical and organizational roadblocks that stand in the way of implementing cross-agency and multi-agency systems.

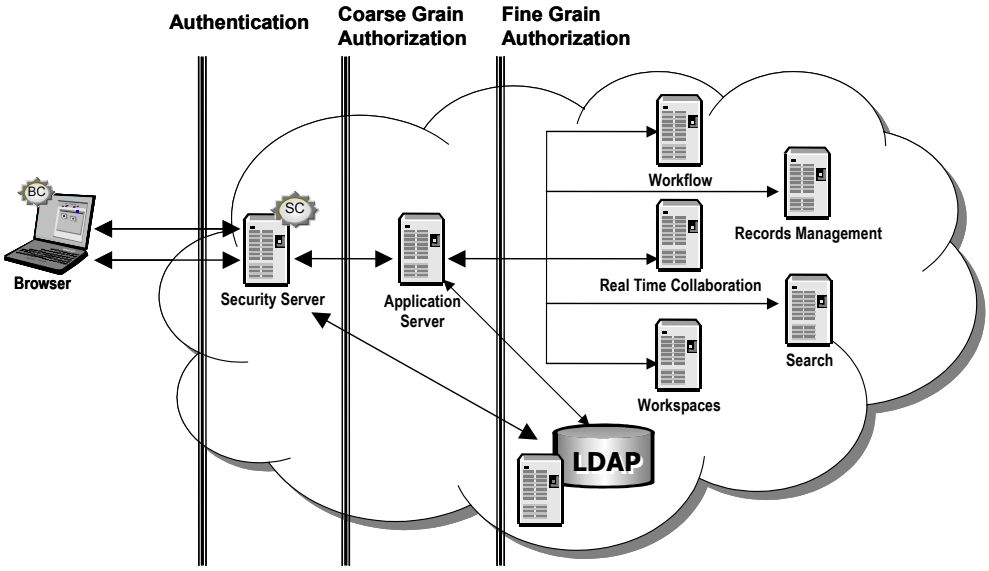
Security Architecture

Network, information, and application security, important to all systems, are especially critical in collaborative and inter-agency environments. Security is the enabler that makes inter-agency access to knowledge systems possible, establishes the trust necessary for users to share knowledge and collaborate, and allows the owners of critical data and applications to share their systems across government organizations.

The Knowledge and Collaboration System was designed to create a secure framework for interagency collaboration and information access. Multiple levels of access control provide a personalized user experience and ensure users see only the data, documents, alerts, workspaces, and virtual meetings that they are authorized to see.

The Knowledge and Collaboration System employs tools that manage user access to systems and information enabling single sign-on built with security services and a secure directory to specify each user's access rights within the environment. Users can be authenticated using biometric identification, digital smart cards, user id and password, or other authentication methods. Once signed in, the user's access to tools and information within the system is controlled with security services and the system directory, providing a tightly controlled secure environment that implements agency security policies, as depicted in Figure 3.

Figure 3: Security Architecture



Key aspects of security include:

- **Authentication** — the system can provide authentication using biometric , digital smart cards, PKI, user id and password, or other methods
- **Single Sign-on** — user credentials are forwarded to back end systems, providing single sign-on access to knowledge and collaboration capabilities as well as legacy databases and back end systems
- **Multiple Levels of Access Control** — the portal server displays appropriate applications and personalized pages based on user access rights and preferences. Collaboration, workflow, and legacy applications provide granular access control to documents, workspaces, virtual meetings, data and application functionality within the single sign-on framework.
- **Secure Cross-Database Search** — the advanced search functionality provides information search and filtering across multiple data and information sources (databases, collaborative spaces, document libraries, file servers, etc) and returns only those results that the user is authorized to access.
- **Workspace Security** — access control is applied at multiple levels, including: 1) workspace—users can create private workspaces for crisis or other restricted needs; 2) sub room—workspace creators can add private sub-rooms within workspaces to engage in private collaboration; 3) documents/forms—users establish edit rights when posting pages and documents
- **Virtual Meeting Security** — virtual meetings, which can be established by users at any time, are secured by restricting access to select people and requiring additional meeting-specific passwords.

For More Information

For further information, contact

IBM
Todd Tracy (301) 803-6137
toddt@us.ibm.com

AMS
Cathy Hirsh (703) 227 5775
cathy.hirsh@ams.com

About IBM

The IBM Knowledge and Collaboration practice includes more than 1,000 professionals dedicated to the technologies and techniques of deploying knowledge and collaboration solutions. The practice offers a wide range of strategy, community, portal, and content management expertise. These offerings are backed up by a proven methodology, world-class technology and research from IBM's labs, experience from IBM's Global Services, and practical experience from IBM's global intranet and hundreds of real-world engagements.

About AMS

AMS is an international business and IT consulting from with revenues of $1.3 billion and more than 7,000 employees worldwide. AMS's Knowledge and Collaboration program is renowned for its innovative use of worldwide communities of practice, and has received numerous awards. AMS manages mission-critical IT, e-business and systems integration projects for clients including 43 state governments, most federal agencies, and hundreds of companies in the Fortune 500.